

<b>Notice of Allowability</b>	Application No.	Applicant(s)	
	09/607,513	MEGIDDO, NIMROD	
	Examiner	Art Unit	
	Kandasamy Thangavelu	2123	

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to March 15, 2005.
2. ☒ The allowed claim(s) is/are 1-36.
3. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
  - a) ☐ All    b) ☐ Some\*    c) ☐ None    of the:
    1. ☐ Certified copies of the priority documents have been received.
    2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
    3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS ( as "replacement sheets") must be submitted.
  - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review ( PTO-948) attached
    - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
  - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.

Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- |   |  |
|---|--|
| 1. <input type="checkbox"/> Notice of References Cited (PTO-892)  | 5. <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)            |
| 2. <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                | 6. <input type="checkbox"/> Interview Summary (PTO-413),<br>Paper No./Mail Date _____. |
| 3. <input type="checkbox"/> Information Disclosure Statements (PTO-1449 or PTO/SB/08),<br>Paper No./Mail Date _____ | 7. <input checked="" type="checkbox"/> Examiner's Amendment/Comment                    |
| 4. <input type="checkbox"/> Examiner's Comment Regarding Requirement for Deposit<br>of Biological Material          | 8. <input checked="" type="checkbox"/> Examiner's Statement of Reasons for Allowance   |
|   | 9. <input type="checkbox"/> Other _____.   |

## **DETAILED ACTION**

### ***Introduction***

1. This communication is in response to the Applicant's communication dated March 15, 2005. Claims 1-36 of the application are pending.

### ***Drawings***

2. The drawings submitted on June 28, 2000 are accepted.

### ***Examiner's Amendment***

3. Authorization for this examiner's amendment was given in a telephone conversation by Mr. George Gates on April 25, 2005.

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

4. In the Claims:

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In Claim 13, Lines 1-2, "A computerized apparatus for solving stochastic control problems of linear systems in high dimensions, comprising:"

has been changed to

-- A computer apparatus for solving stochastic control problems of linear systems in high dimensions, comprising:--.

In Claim 25, Lines 1-2, "An article of manufacture embodying logic for solving stochastic control problems of linear systems in high dimensions, the logic comprising:"

has been changed to

-- An article of manufacture embodying a computer readable medium storing a computer program comprising computer executable instructions, which when executed by a computer perform a process for solving stochastic control problems of linear systems in high dimensions, the computer program comprising instructions for: --.

### ***Reasons for Allowance***

5. Claims 1-36 of the application are allowed over prior art of record.
6. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

The closest prior art of record shows:

(1) the Markov Decision Problem (MDP) can be generally formulated as an equivalent Linear Programming (LP) problem; in the MDP, the state is a linear function of the actions; selecting an optimal policy reduces to minimizing a linear cost function; this minimization is constrained since the states belong to the state space of nonnegative integers; the other constraints are also linear in the control; in the linear program, the control variables take values in a continuum; in MDP, the controls are integer-valued; since the actions depend only on the most recent state the policies are Markovian; the cost function of the MDP is related to the value function of the related LP; the optimal cost function of the MDP will inherit the properties of the value function if the linear program admits integer valued solution **Viniotis et al.** ("Linear programming as a technique for optimization of Queueing systems", IEEE, 1988);

(2) Markov Decision Process (MDP) formulation of production scheduling; the MDP is defined by a state space, an action set, a reward function and a probabilistic transition model; the solution to the MDP is a policy which if followed will maximize the expected reward attainable starting from a state,  $x$ ; the solution to the MDP is a value function, specific to the current demand forecasts; the optimal reward is given by the optimal value function; a reinforcement learning method is used for generating an approximate value function; it produces a time-dependent policy specifically built to match current demand forecasts **Schneider et al.** ("Stochastic Production scheduling ... demand forecasts", IEEE, 1998); and

(3) a computer implemented planning resources and decision support tool; the method generates a match between existing assets and demands across multiple manufacturing facilities; it establishes a set of actions for manufacturing to insure the delivery of commitments; it creates synergy between MRP, LP and heuristic to create a superior solution; it provides an LP based

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solver which allows the user to make trade-offs in on-line delivery between classes of demand; the method includes supply chain analysis component **Dangat et al.** (U.S. Patent 5,971,585).

6.1 Applicant's first set of claims consists of Claims 1-12.

Independent Claim 1 is directed to a method for solving in a computer, stochastic control problems of linear systems in high dimensions. The claim identifies the uniquely distinct features of:

"building, in the computer, one or more approximations from above and from below to a value function for the state using representations that facilitate the computation of approximately optimal actions at any given state by linear programming".

Because the closest prior art fails to teach or fairly suggest building, in the computer, one or more approximations from above and from below to a value function for the state using representations that facilitate the computation of approximately optimal actions at any given state by linear programming, as claimed by the Applicant, Claims 1-12 are deemed novel and allowable.

6.2 Applicant's second set of claims consists of Claims 13-24.

Independent Claim 13 is directed to a computer apparatus for solving stochastic control problems of linear systems in high dimensions. The claim identifies the uniquely distinct features of:

“logic, performed by the computer, for building one or more approximations from above and from below to a value function for the state using representations that facilitate the computation of approximately optimal actions at any given state by linear programming”.

Because the closest prior art fails to teach or fairly suggest logic, performed by the computer, for building one or more approximations from above and from below to a value function for the state using representations that facilitate the computation of approximately optimal actions at any given state by linear programming, as claimed by the Applicant, Claims 13-24 are deemed novel and allowable.

6.3 Applicant's third set of claims consists of Claims 25-36.

Independent Claim 25 is directed to an article of manufacture embodying a computer readable medium storing a computer program comprising computer executable instructions. The claim identifies the uniquely distinct features of:

“building one or more approximations from above and from below to a value function for the state using representations that facilitate the computation of approximately optimal actions at any given state by linear programming”.

Because the closest prior art fails to teach or fairly suggest building one or more approximations from above and from below to a value function for the state using representations that facilitate the computation of approximately optimal actions at any given state

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by linear programming, as claimed by the Applicant, Claims 25-36 are deemed novel and allowable.

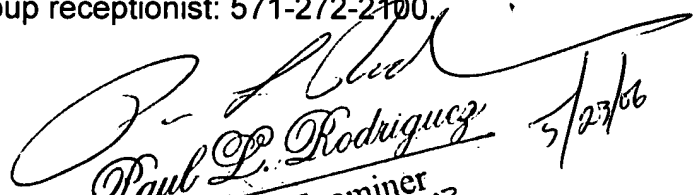
7. Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 571-272-3717. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Paul Rodriguez, can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

K. Thangavelu  
Art Unit 2123  
May 23, 2006

  
Paul L. Rodriguez  
Primary Examiner  
Art Unit 2123  
5/23/06